Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ABSTRACTS OF WATER WORKS LITERATURE

FRANK HANNAN

Key: American Journal of Public Health, **12**: 1, 16, January, 1922. The figure 12 refers to the volume, 1 to the number of the issue, and 16 to the page of the Journal.

Rules and Regulations. Ohio State Board of Health, revised and adopted July 19, 1921. Of interest to the engineer is the chapter on sanitary engineering, pages 37 to 55. This chapter deals with waste disposal, protection of wells, the requirements of the Board in the matter of sewage treatment plants, garbage disposal plants, water supply and water purification plants, and standards of purification. Reports and plans of proposed water works must be submitted to the Board for approval and the character of the reports and drawings required are set forth in detail. In passing, it is interesting to note the following paragraph on page 52: "If for the purpose of fire protection it is necessary to provide pipes by which partly treated water or raw water can be turned into the mains, they shall have valves upon them of such a character that they may be properly sealed by the State Board of Health or local Board of Health." This appears to afford opportunity for potentially dangerous water to be discharged at times into the mains, as the sealing of the valves affords no assurance that the valves will not be opened and unsafe water supply sent to the consumer.—*E. S. Chase.*

Engineering Bulletin No. 1. Maryland State Department of Health, **1**: 1, October 1, 1921. A collection of papers upon various phases of water supply prepared by members of the engineering force of the Maryland State Department of Health. These papers have already been published in various technical journals. Table of contents as follows:

Introductory Statement.

A Plan for Meeting Water Supply and Sewerage Costs, by Robert B. Morse and Abel Wolman

A Preliminary Analysis of the Degree and Nature of Bacterial Removal in Filtration Plants, by Abel Wolman

Chlorine Absorption and the Chlorination of Water, by Abel Wolman and Linn H. Enslow

Water Chlorination Control by the Absorption Method, by Abel Wolman.

Index Numbers and Scoring of Water Supplies, Parts 1 and 2, by Abel Wolman.

The Statistical Method in Problems of Water Supply Quality, by Abel Wolman.

Sanitary Effect of Water Storage in Open Reservoirs, by Abel Wolman and S. T. Powell.

The Surface Shrinkage of Rapid Filter Sand Beds, by Abel Wolman and S. T. Powell.

Residual Aluminum Compounds in Water Filter Effluents, by Abel Wolman and Frank Hannan.

Further Observations on pH in Natural Waters, by Abel Wolman and Frank Hannan.

—*E. S. Chase.*

Health Laws and Regulations. Minnesota State Board of Health, November 1, 1921. Laws relating to water supply are given on page 22. The laws make it a felony knowingly to permit water works appliances to become in such condition as to impair the healthfulness of water supplies. Regulations of the Board of Health regarding water supply are given on page 49. Plans for new water works and modifications of old systems must be approved by the Board. Cross connections between safe and unsafe supplies are prohibited. Contracts between municipalities and private water companies must be approved by the State Board of Health in so far as the sanitary quality is concerned.—*E. S. Chase.*

State Department of Health of New Jersey. Annual report for the year ending June 30, 1921. Report of the Bureau of Engineering page 87, describes the organization and work of the Bureau. In connection with an investigation of the significance of B. Welchii, it is the opinion of the Bureau that the presence of this organism has no particular sanitary significance in judging quality of water supply. It is also the opinion of the Bureau that the chlorination of water supplies is a temporary measure only and under certain circumstances additional protection by prolonged storage or filtration is required. Only a small proportion of New Jersey is now supplied with untreated water. Of the urban population 46 per cent is now provided with filtered water, 31 per cent with chlorinated water and 1.5 per cent receives unfiltered surface water. It is interesting to note that no outbreak of typhoid fever occurred during the year, as a result of infected public water supply. Valuable data upon water treatment plants in New Jersey is given in tabular form, together with the results of analyses. In the report of the State Laboratory of Hygiene, the results of a B. Welchii investigation (page 128) are summarized. Some 26 water supplies were examined serving 1,600,000 consumers, and of these supplies 19, serving 800,000 consumers, showed B. Welchii present in 50 cc. samples, but in amounts not exceeding 4 per 50 cc. B. Welchii were also found in milk supplies.—*E. S. Chase.*

Index to Bulletins 1 to 16 of the Division of the State Water Survey. Department of Registration and Education, Urbana, Illinois, 1921.—*E. S. Chase.*

The Influence of Sanitary Engineering on Public Health. GEORGE W. FULLER. American Journal of Public Health, 12: 1, 16, January, 1922. A general discussion of the accomplishments of the engineers along sanitary lines in the field of water supply, water purification, sewage, sewage disposal, controlling of streams and collection and disposal of solid wastes. In the matter of water supply and water purification, Mr. Fuller briefly reviews the historical development of water purification in America, and points out that as a result of water purification a marked reduction in typhoid fever death rates has been brought about, as shown in a table of typhoid fever death rates for the principal large American cities since 1880. The necessity for proper supervision and laboratory control of purification plants is pointed out. The value of chlorination is also referred to, but the danger of placing too great reliance on chlorination alone is emphasized.—*E. S. Chase.*

The Proper Size of Sand for Rapid Sand Filters. W. H. Dittoe, American Journal of Public Health, 12: 1, 44, January, 1922. Paper deals with rapid sand filters having sand of various effective sizes. In passing upon the result of operation, the Ohio State Department of Health has concluded that an effluent of disinfected water should show the absence of gas formation in 10-cc. samples, that the purification plant should produce a final product of this requirement under the worst conditions of raw water, and that the plant should be so operated that each part of the process will produce its proper share of the work. Disinfection to be considered as a factor of safety only. An approximate standard for filtered water, but without disinfection, is that not more than 20 per cent of the 10 cc. samples should show gas formation. A study of the efficiencies of Ohio plants showed that those plants having coarse filter sand, effective size 0.6 mm. or more were not producing uniformly satisfactory results. While on the other hand it was found that plants having fine filter sand, effective size 0.45 mm. or less, were producing with regularity a filtered water of high degree of purification. There were no important differences in the kind of raw water, plant design, method and control of operation, except the sand used as filtering medium. As a result of the particular studies the following tentative specifications were adopted: sand shall have an effective size between the limits of 0.35 mm. and 0.42 mm., and a uniformity coefficient not greater than 1.8. Preference will be given to sand having an effective size of 0.37 mm. and a uniformity coefficient not exceeding 1.6, all particles of which are finer than 1 mm. Objections to the use of fine sand, such as increase in loss of head and percentage of wash water, loss of sand through underdrainage or strainer system and in the wash water, together with the increased cost for sand of the specifications above set forth, are met. Experience shows that the fine sand does not involve an increase of wash water, nor that there is any material reduction in the volume of the sand. The cost of the sand in meeting the more rigid requirements is somewhat greater, but Mr. Dittoe claims that this increased cost is small in comparison with the total cost of the purification plant, and is offset by the higher efficiencies obtainable. This paper is discussed by Alexander Potter, Consulting Engineer. Mr. Potter raises a question as to whether the State in making requirements which must be met by the engineer and the contractor should not guarantee results. This suggestion appears similar to the demand from certain quarters in Massachusetts that the state shall guarantee savings bank deposits. Mr. Potter also points out the increased cost to contractors in meeting the specifications. This objection to the standard proposed does not appear to be serious if the contractor appreciates the importance of securing proper sand in the first place, as he is then in a position to protect himself when he makes his original bid. It seems quite general for contractors to fail to appreciate the importance of proper filter medium and any removal of safeguards in the matter of specifications for sand appears unwise.—*E. S. Chase.*

How a Water Company Co-operates with Water Users. Eng. & Cont., 57: 6, 127, February 8, 1922. A reprint of a folder issued to water consumers by the Terre Haute Water Works Company, Terre Haute, Indiana, Dow Gwinn, President and Manager. This pamphlet instructs the householder in matters relative to the shutting off of water, the care of sill cocks, the thawing of frozen pipes, and the care of water closets, with the object of preventing water waste. An example of educational publicity by a progressive water works company.—*E. S. Chase.*

Methods of Blasting Drilled Wells to Increase Flow of Water. Eng. & Cont., 57: 6, 127, February 8, 1922. Abstract of an article by S. R. Russell, in the November-December, 1921, issue of the DuPont Magazine. The desirability of blasting drilled wells will depend upon the character of strata penetrated, and the quantity of water probably contained therein. In sand strata blasting has practically no effect, as the material will settle back around the casing. In water bearing rock, however, passageways into the surrounding rock may be opened up and the cross sections of the boring enlarged, thereby increasing the yield. Methods of blasting are derived from oil well shooting. The explosive is placed and fired at the water bearing stratum. A heavy charge of quick, powerful explosive is required. The article describes in some detail the quantity of charge, kind of explosives to be used, the method of placing and exploding the cartridges and means for prevention of collapse of the casing.—*E. S. Chase.*

The Proper Charges for Fire Protection. HENRY L. GRAY. Eng. & Cont., 57: 6, 134, February 8, 1922. A study and analysis of water works charges and earnings prepared by Gray in 1921 for the Pacific Power & Light Company relative to its water plant in Yakima, Washington. This paper discusses the apportionment of water systems between fire protection and other services. Three methods are referred to: (1) Residue plant; (2) Comparative plant; (3) Maximum demand. The author advocates the third method which is based essentially upon the relation of the maximum demand for fire service to the maximum demand for all other services. By the maximum demand method the author estimated that a fair charge to the City of Yakima for fire protection should be $33,883 yearly as compared with $7399 actually paid in 1920 on the hydrant rental basis. The paper concludes with a table showing the allocation by various commissions of plant value and gross earnings required for fire service in some 47 municipalities.—*E. S. Chase.*

Experiments Show Measurement of Valve Loss Dependent on Piezometer Location. Eng. & Cont., 57: 6, 137, February 8, 1922. Abstract of article from the Wisconsin Engineer (January, 1922) University of Wisconsin. Experiments indicated that the loss of head due to flow through valves should be obtained by piezometers located at least fifteen or twenty diameters below the valve. The disturbance caused by the water passing through the valve will affect results obtained with piezometers set nearer the valve.—*E. S. Chase.*

Population 1920. U. S. Bureau of Census, 1921. Report of the 14th decennial census which presents statistics showing the number and distribution of the population of the United States by states, counties, incorporated places and other minor civil divisions.—*E. S. Chase.*

Siphon Pipes of the Catskill Aqueduct. Municipal Engineers Journal, Third Quarterly Issue, 1921, page 93. A notice of the awarding of three contracts, total $6,252,788 for the construction of two pipes in each of the 14-foot steel pipe siphons along the line of the Catskill Aqueduct. One pipe is now in place and the additional pipes will be capable of carrying the capacity of the aqueduct which is in excess of 500,000,000 gallons daily. The new pipes will be of riveted steel, 7 feet 4 inches to 11 feet 3 inches nominal inside diameter with plates $\frac{7}{16}$ to $\frac{9}{16}$ inches thick, lined with Portland cement mortar, enveloped with concrete and covered with earth and rock.—*E. S. Chase.*

Proc. American Society for Testing Materials 21: 1921. Compilation of committee reports, tentative standards submitted or revised at 1921 annual meeting, tentative revisions of standards and technical papers.—*E. S. Chase.*

Determination of pH in Water by Means of Indicators without Buffer Solutions. L. MICHAELIS. Zeitsch. Untersuch. Nahr. Genussm., 42: 75–80, 1921. (cf., The Analyst, February, 1922.) Into each of six tall test glasses are put 40 cc. of 0.02 N NaOH freshly diluted from N solution, and 0.25, 0.29, 0.33, 0.38, 0.45, 0.50 cc. of a standard solution of m-nitrophenol (0.3 gm. in 300 cc. diluted 1:10 for use). To 40 cc. of the water to be tested is added from a graduated pipette a sufficient quantity of the indicator solution to match the color of one of the standard alkali tubes. Let F denote the volume of the indicator solution in the particular standard color tube which is matched, divided by that added to the water tube, then pH is calculated from the equation pH $= P_K + S + g + \emptyset$, where P_K is the constant for the indicator ($= 8.33$ for m-nitrophenol), s is the salt correction (for sea-water $= 0.16$, and for fresh water a negligible quantity), g is the temperature correction, which is negligible at ordinary temperatures, and $\emptyset = \log \frac{1 - F}{F}$. Curves are given, which show the last named quantity at a glance.—*A. Wolman.*

Air-Lift System. J. S. OWENS. Canadian Engineer, 42: 256, February 21, 1922. Advantages of this system of pumping are discussed and an explanation given of how the low efficiencies often encountered may be avoided.—*R. E. Thompson.*

The Rate of Solution of Oxygen in Water. H. G. Becker. Sci. Proc. Roy. Dublin Soc., 16: 334–44 (1921). From Chem. Absts., 16: 363, February 10, 1922. Co-worker of Adeney describes apparatus for determining rate of solution of oxygen in water. Rate of solution was found graphically to be a linear function of the rate of stirring, surface area remaining constant. Very gentle stirring of the under layers of the liquid was found to increase the rate of solution as much as twenty-fold, as compared with stationary water.—*R. E. Thompson.*

The Coagulation of Colloids by Electrolytes. L. Michaelis and C. Timenez-diaz. Kolloid-Z, 29: 184–90 (1921). From Chem. Abst., 16: 370, February 10, 1922. It is pointed out that no theory of the coagulation of colloids by electrolytes can satisfactorly explain all results unless the influence of the H^+ and OH^- ions is taken into account. For instance it was found in experiments on Congo rubin with various concentrations of Na^+ and K^+ that these two ions have the same effect. The coagulating power is a function of the H^+ and alkali ion concentration. The anions in this case were without influence. The authors develop a law which they call the "law of ionic synergism."—*R. E. Thompson.*

The Preparation of Carbonate-Free Alkali. I. M. Kolthoff. Pharm. Weekblad, 58: 1413–7 (1921). From Chem. Abst., 16: 393, February 10, 1922. An approximately 1.1 N solution is prepared from commercial sodium hydroxide and 50 cc. milk of lime per liter added. After standing overnight the supernatant liquid is syphoned off, titrated and diluted to 0.1 *N* with carbon dioxide-free water. The calcium content does not exceed 1 to 2 mgm. per liter, which is negligible in most analytical procedures.—*R. E. Thompson.*

Uses of Stainless Steel. Anon. Engineering, 112: 592–594 (1921). From Chem. Abst., 16: 401, February 10, 1922. Experiments show that stainless steel is superior to phosphor-bronze, nickel-bronze, brass and mild steel for turbine blading. Examination of a turbine with blades containing 5 per cent Ni alongside stainless steel blades (13.4 per cent Cr and 0.30 per cent C), after being in operation 3471 hours showed the stainless steel to be unaffected while the Ni steel blades were materially roughened at the inlet edges and had also suffered corrosion. Stainless steel can be used to advantage for rams for hydraulic pumps and other purposes.—*R. E. Thompson.*

Structural Steel Paints. J. S. Coye. Iowa Eng. Exper. Sta., Bull 54, 68 pp. (1919). From Chem. Abst., 16: 503, February 10, 1922. Zinc chromate is the best pigment and may be used to advantage with other ingredients such as Fe oxide. Coal-tar paints are worthless as a steel coating. Gypsum and whiting are harmful when in excess of 5 per cent of the paint pigment.—*R. E. Thompson.*

Adsorption. A. P. Mathews. Physiol. Rev., 1: 553-97 (1921). From Chem. Abst. 16: 425, February 10, 1922. Adsorption is considered to be a chemical rather than a physical phenomenon. The forces of cohesion and chemical affinity differ in several particulars. Cohesion varies inversely as the fourth power of the distance, chemical attraction probably inversely as the square. Included in the discussion are surface tension and the charge on colloidal particles which is stated to be due, not to adsorbed ions, but to chemical additions and subsequent ionization of the compound.—*R. E. Thompson.*

Kutter's Formula Simplified. H. E. Babbitt. Eng. & Cont., 57: 6, 128, February 8, 1922. The writer claims that "in ordinary problems met in the design of sewers, drainage ditches and other small open channels, the discrepancy between the value of V as found by Kutter's formula"

$$V = \frac{\frac{1.81}{N} + 41.67 + \frac{0.0028}{S}}{1 + \frac{N}{\sqrt{R}}\left(41.67 + \frac{0.0028}{S}\right)} \sqrt{RS} \qquad (1)$$

in which V = Velocity of flow in feet per second
N = Roughness coefficient of material of conduit
R = Hydraulic radius, in feet
S = Slope of hydraulic gradient

and the value of V omitting the term $\frac{0.0028}{s}$ is negligible. If this term is omitted this formula can be written as

$$V = \frac{(1.81 + 41.67\,N)\sqrt{R}}{N\sqrt{R} + 41.67\,N^2} \sqrt{RS} \qquad (2)$$

A table is given showing values of C and the percent error in same as determined by Kutter's original and the modified formula, for S (slope) 0.00005; 0.0001; 0.001; 0.0 (N) = 0.010 and 0.020; and hydraulic radii of 0.1; 1; 3.28; 4 and 8 feet.—*A. E. Gorman (courtesy I. W. Mendelsohn.)*

History of Water Purification. Geo. C. Whipple, Proc. A. S. C. E., 47: 10, 654, December, 1921. The history of water purification in the United States is intimately connected with the general movement to improve sanitation as well as with the rise of modern science. The English public health system dates from 1848. The Massachusetts State Board of Health was established in 1869. The American Association of Public Health was founded in 1872. It was during the last half of the 19th Century that modern science began its remarkable development. The rise of the science of bacteriology caused the modern development of this greatest of the sanitary arts—the art of water purification. Kirkwood's report for St. Louis, Mo., in 1866, on filtration practice in England and Germany, may be said to mark the beginning of the history of water purification in America. His plan, however, was not adopted by St. Louis. Other filters, however, were built as a result of his report, notably the filter at Poughkeepsie, N. Y., constructed in 1873. In 1887 the Massachusetts State Board of Health established an experiment station at Lawrence and the purification of water was studied from all possible angles. In 1893 a sand filter without a roof was put into operation for the City of Lawrence. In 1884 Alpheus Hyatt obtained a patent on the use of sulphate of alumina as a coagulant and in the same year a mechanical filter using such a coagulant was built at Somerville, N. J. Albert R. Leeds was the real inventor of this process. In 1883 Charles Hermany conducted experiments at Louisville, Ky., and again from 1895 to 1897 he studied the problem of filtration for the Louisville Water Company. The principles thus established have served as the basis of the mechanical filters. The experiments at Lawrence and Louisville demonstrated the fact that, although slow sand filtration can be used successfully with a relatively clear water, coagulation must accompany filtration in the case of muddy water. The Albany covered filter built in 1899 has served in many ways as a model for the sand filters. The first important mechanical filter to be constructed along modern lines was that of the East Jersey Water Company in 1902. It was, therefore, just about the beginning of the 20th Century when water purification in the United States really began to advance as a practical measure. In 1870 practically no filtered water was in use in this country. In 1921 more than one-third of the people living in cities which contained 2500 or more inhabitants are using filtered water. The number of filters is not far from 800. (There are still some places where grossly polluted water is being distributed to the people.) Consumers are now thinking less about the dangers of their water supplies, that is, they are seeking refinements. The economies of filter operation can now be studied more carefully than was possible 25 years ago and this is a phase of the subject which is likely to receive increasing attention. Engineers now are interested in knowing what the filter actually does and the analyses must serve as a test of the filter operator as well as the filter itself. At the moment, a new impetus is being given water purification by the use of hydrogen ion concentration. Some more careful measure of the effect of water on the health of the community is urgently needed to supplement the b. coli test.—*E. E. Bankson.*

Recent Developments in Water Filtration. ALLEN HAZEN. Proc. A. S. C. E., 47: 10, 660, December, 1921. Treatment of water so as to purify it adequately without making it aggressive is one of the most difficult problems at present. An aggressive water attacks and tuberculates the pipes. Quiet waters do not have this tendency to attack metal. This deposit is a dirty mud which moves forward with disturbed flow and makes the water dirty and disagreeable. Alkalinity and carbonic acid really have something to do with aggressive qualities, but all the conditions cannot be accounted for by them. A great deal is known in a practical way as to which waters are aggressive. The waters of the Great Lakes are almost always quiet. In the Mississippi Valley, from the Alleghanies to the Rockies, the surface waters can be handled so that the resulting products will be reasonably quiet. Soft waters are frequent nearer the coasts. These waters are much more apt to be aggressive, and it is with them that the greatest practical difficulties have been met. The question of arranging all the treatments of public water supplies so as to keep them always quiet is one of the most interesting and important aspects of water purification at the present time.—*E. E. Bankson.*

Interference with Filtration by Wastes from By-Product Coke Ovens and Gas-Works. C. A. Emerson, Jr. Proc. A. S. C. E., 47: 10, 662, December, 1921. Discharge of liquid wastes from by-product coke ovens and commercial gas plants into stream and lakes becomes a matter of grave concern to many cities, due to the disagreeable tastes and odors which these wastes impart to the water. Wastes from the separators of by-product coke ovens, together with the sludge, impart a characteristic taste to river water. This taste may persist for days and may be noticeable in the effluent from filtration plants. Application of chlorine seems to accentuate these taste-producing characteristics. Fortunately, the remedy for this pollution lies within the works, and consists simply of using the wastes for quenching or cooling the flowing coke taken from the ovens. Interference with water supplies by the wastes from plants producing water gas has been noticeable and the taste-producing characteristics are accentuated by chlorination of the drinking water. In this case, again, a remedy can be developed at the gas works. Installation of settling and skimming basins for removal of the greater portions of the heavier tars and the light floating oils, with the effluent for re-use in the "gas scrubbers," will reduce the volume of wastes reaching the stream to a small fraction of that which occurred before and the company recovers marketable materials.—*E. E. Bankson.*

Recent Progress in the Reduction of the Typhoid Death Rate and its Significance. C.-E. A. Winslow. Proc. A. S. C. E., 47: 10, 664, December, 1921. For ten years to 1908 each of thirty-five cities had average death rate of more than fifteen, and up to 116.9 per 100,000. In the last three years, however, only one city of the same thirty-five has had rates of more than fifteen, only six had rates of more than ten, while more than one-third have had rates below five per 100,000 and this is general throughout the United States. The water works engineer, however, should not receive all the credit because other powerful forces have also been at work.—*E. E. Bankson.*

The Effect of Improvements in Water Supplies on Typhoid Death Rate in New York State. C. A. Holmquist. Proc. A. S. C. E., 47: 10, 667, December, 1921. In 1901, a State Department of Health was created. In 1906 the Division of Sanitary Engineering was established. Before 1906, the average death rate from typhoid fever for the whole State was 23.4. Since 1906, the average rate has been 9.4, until in 1920 a remarkably low level of 3.5 was reached. Although other factors have had some effect, the decrease has been due largely to improvements in water supplies. Several cases are cited to show that a decided drop in the typhoid fever death rate occurred immediately after the construction of the filtration plants.—*E. E. Bankson.*

Purification of Soft Colored Waters. R. S. Weston. Proc. A. S. C. E., 47: 10, 670, December, 1921. A drinking water should have an *average* color of not more than 10 parts per million and not over 15 maximum. It is most often impracticable to store waters long enough to decolorize them sufficiently and, for this reason, many stored colored waters are filtered. Most of the color in water is in the form of a colloidal suspension. These colloidal particles are not all alike. They possess electrical properties, usually negative, and will coagulate with aluminum hydrate, but some are positive and will not so respond. A slow sand filter is usually unable to remove more than one-fifth of the color from a stored water. The mechanical filter, per se, is an efficient device, and the remedy lies in better chemical treatment. This will require much investigation and many trials. At the present time, sulphate of alumina is added until coagulation takes place, and, in most cases, soda is added to maintain an alkalinity of at least 7 parts per million. Frequently, this method fails or the treated water may corrode the distribution system. Many facts are known, but the principles on which they are based are not yet clear. The problem, therefore, is to substitute a more accurate analysis of color and a more proper dosage with chemicals.—*E. E. Bankson.*

The Operation of Reservoirs for Water Supply. SAMUEL A. GREELEY. Proc. A.S.C.E., **47**: 10, 674, December, 1921. The principal considerations are the use of reservoirs other than for water supply purposes and their maintenance for water supply purposes. The first includes the regulation of the reservoir for bathing, boating, picnicking, etc., as affecting the safe load on water filtration plants. The second includes operations for maintenance of the reservior such as draining and clearing the banks, protection, handling of silt, control of fish life and the like. Some method of patrol is almost always undertaken. A number of rules governing the use of reservoirs have been suggested. The aim of these rules is to prevent the use of the reservoir for bathing, fishing, etc., or to permit some boating, etc., under regulation. Practice indicates that bathing *should not* be permitted with unfiltered supplies and the tendency is against boating, etc. For filtered supplies the use of reservoirs for such purposes appears to be increasing under careful sanitary patrol.—*E. E. Bankson.*

Construction Progress on the Hetch Hetchy Water Supply of San Francisco, California. M. M. O'SHAUGHNESSY. Proc. A. S. C. E., **48**: 2, 147, February, 1922. The Hetch Hetchy water supply project is to supply the Metropolitan Water District 400,000,000 gallons of water daily and to produce 200,000 hydroelectric horse power from the Tuolumne River and tributaries, in the Sierra Nevada Mountains, more than 150 miles from San Francisco on the aqueduct line. The Hetch Hetchy Dam is to be built now to about three-fourths of its ultimate height and thus develop about 60 per cent of the ultimate reservoir capacity. The watershed area covers 652 square miles. Its elevation ranges from 3500′ to 13,090′ and the Congressional grant fixes sanitary regulations. Reservoirs—Hetch Hetchy, elevation, now 3720, future 3800, total capacity 113,500,000,000 gallons. Contract for initial dam—1919 at $5,447,792. Lake Eleanor, elevation, now 4660, future 4715, ultimate capacity 54,000,000,000 gallons. Cherry Valley and other reservoirs later. The Priest Regulating Reservoir, elevation, 2170, capacity—2 days flow of the aqueduct or 800,000,000 gallons. Connection to the Spring Valley System at Crystal Springs reservoir—capacity now 22,000,000,000 gallons, ultimate capacity 50,000,000,000 gallons at elevation 325. Amazon receiving and distributing reservoir, at San Francisco, capacity about 300,000,000 gallons, elevation 248. Hydroelectric power plants—(at power drops) below Lake Eleanor, Hetch Hetchy and Priest Reservoirs. Contract for constructing the aqueduct tunnel from Early Intake to Priest Reservoir was awarded on the cost-plus-fee basis and the men are working under a bonus system. All expenditures to the present time total about $14,000,000.—*E. E.Bankson.*

The Vertical Triple-Expansion Pumping Engine. A Study of Installations at Cleveland, Ohio, During the Past Sixty-five Years. L. A. QUAYLE AND E. H. BROWN. Mechanical Engineering, **44**: 3, 155, March, 1922. From the standpoint of depreciation Cornish Engine No. 2 was in operation a total of forty-nine years. The Cornish boilers were in operation for 33 years until dismantled because of obsolescence. The effect of increase in steam pressure from 22 pounds in 1856 to 210 pounds today, with improvements in boiler and stoker efficiencies and changes in pumping engine design, has increased the duty from 37,000,000 foot-pounds per 100 pounds of coal in 1856 to 127 in 1920 (without economizers), and the equivalent pounds of coal per kilowatt hour was decreased from 7.5 in 1856 to 2.1 in 1920. The authors' investigation leads them to believe that the Division Avenue station contains at least one and possibly four engines whose duty record and thermal efficiency have never been equaled by any other steam-driven pumping engine, namely 211,000,000 foot-pounds of work per 1000 pounds of steam used and 24.3 per cent thermal efficiency. It is instructive to compare the thermal efficiency (including auxiliaries) of 24.3 per cent obtained on the 1400-hp. vertical triple-expansion pumping engine with 24.8 per cent, the maximum thermal efficiency (excluding auxiliaries) of the Interborough Rapid Transit 45,000-hp. cross-compound turbo-generator; with 24.1 per cent, the maximum thermal efficiency obtained by any one of four 40,000,000 gallons-per-day low-head 300-hp. Humphrey gas pumps at Chingford, England; and also with the 24.1 per cent thermal efficiency obtained on a 1500-hp. natural-gas-engine generating unit of the American Locomotive Company at Alleghany, Pennsylvania, as it shows that these four distinctly different types of units have all reached a point of development at about the same time at which they give practically the same thermal efficiency. This would seem to indicate that any large improvement in the future of any one type must call for a radical departure from the present trend of development.—*E. E. Bankson.*

A Brief on Depreciation. The American Gas Association (130 East 15th Street, New York City) announces in its Bulletin, that it has for distribution to those interested a brief on depreciation charges of Railroads and Public Utilities, submitted to the I.C. C., on behalf of the Consolidated Gas Company of New York and its affiliated companies, by Robert A. Carter, Chairman of the Committee on Rate Fundamentals of the American Gas Association and William L. Ransom, of the New York Bar and counsel for the company in its recent rate litigation. The brief challenges accounting methods of the I. C. C. as to depreciation reserves, and, incidentally, rulings of various state commissions. It contains an exhaustive discussion of the subject which is based on first hand knowledge, rather than on opinions formulated in previous opinions of text writers and public service commissions. It contains also an analysis of the most recent judicial opinions.—*Robert E. Livingston.*

Dilution in the Treatment of Sewage. Peter Gillespie. Canadian Engineer, 42:8,254, February 21, 1922. Originally presented at the Peterboro section of the Engineering Institute of Canada. Author advocates the dilution of sewage effluents, prior to their discharge into bodies of water from which public water supplies are drawn. It is stated that a million gallons of average American sewage requires for its oxidation about 1000 pounds of oxygen. When the oxygen content falls below 70 per cent of saturation, major fish life disappears and when below 30 per cent of saturation is reached, a condition approaching a nuisance, especially in the hot weather, is the result. The self purifying capacity of large bodies of water is shown in that, while the pollution of Lake Ontario at the mouth of the Niagara River is very great, at a distance of 18 miles lakeward from this point, it disappears altogether, judged by the non-occurrence there of the colon bacillus. Five principles are stated as indicating the trend of practice today in the art of sewage treatment:

1. Streams are at once the drainage channels and sources of public water supply of a country.
2. No sewage should be discharged into a stream without some measure of treatment. No public water supply should be taken out without some measure of treatment.
3. Complete purification of sewage is less effective and more costly than a partial purification of the sewage followed by a purification of all water supplies.
4. A wise policy in the design of a plant anticipates the growth of the future and provides for it.
5. Dilution is one of the oldest as well as the most modern of methods.—*Norman J. Howard.*

Corrosion of a Producer-Gas Cooling System. Lloyd E. Jackson. Chemical and Metallurgical Engineering, 26: 60, January 11, 1922. Water of high acidity containing dissolved oxygen and coke dust corroded pipes of cooling system rapidly. Reduction of acidity to where it was alkaline to methyl orange by lime, and reduction of dissolved oxygen by steel turnings, greatly reduced corrosion.—*John R. Baylis.*

Corrosion of Underground Pipes. Chemical and Metallurgical Engineering, 26: 70, January 11, 1922. Bureau of Standards has undertaken an extensive investigation of the corrosive action of soils on gas and water pipes. Forty locations representing different kinds of soils have been selected and every kind of iron and steel pipe in commercial use will be buried. Corrosion will be determined from time to time. Investigation will probably continue over a period of ten years.—*John R. Baylis.*

Results Achieved by the Corrosion Committee, British Institute of Metals. Ernest E. Thum. Chemical and Metallurgical Engineering, 26: 301, February 15, 1922. Extensive investigations to determine cause of failure of brass condenser tubes in marine service were made. Comparison of a twenty-year old tube with one that failed in less than twenty months, shows that the nature of the film first formed has a determining influence on the corrosion taking place. When cast zinc is suspended in distilled water containing acids which pit, hydrogen appears to be evolved in the pits and not at some distant cathode. Experiments with gas-free water seem to show that oxygen is an essential and CO_2 an accelerator of corrosion. Action of distilled water on electrolytic copper here again shows that corrosion largely depends on the first-acquired film. The committee concludes that pitting of brass in sea water is due to a deposit of some sort, and the location of pits a matter of chance. Coke particles, clinkers, sand, glass, flakes of ferric hydrate, or a piece of string may be the cause. The remedy is to prevent the adherence of deposits.—*John R. Baylis.*

Chemical Reactions on Surfaces. IRVING LANGMUIR. Trans. Faraday Soc. (adv. proof), 1921. From Chem. Abst., **16**: 7–8, January 10, 1922. A detailed discussion of surface reactions including the mechanism of adsorption, which is considered to be the time lag between condensation and re-evaporation.—*R. E. Thompson.*

An Electrolytic Method for the Prevention of Boiler Scale. J. SARRAZIN. Z. Dampfkessel u. Masch.; Elektrotechn. Z. 42, 1207 (1921). From Chem. Abst., **16**: 26, January 10, 1922. A piece of flat wrought iron was suspended in the feed water container and a current at 10 volts and 7 amperes applied, making the piece of iron the anode and the boiler plate the cathode. The formation of scale was prevented, owing probably to the evolution of hydrogen on the inner surface of the boiler plate and the calcium sulphate was deposited as a sludge in the bottom of the boiler.—*R. E. Thompson.*

The Water of Crystallization of Permutite. GÜNTHER-SCHULZE. Phys. Techn. Reichsanstalt, Berlin. Z. Electrochem. 27, 402–406 (1921). From Chem. Abst., **16**: 32, January 10, 1922. The influence of the water of crystallization on the behavior of permutite is discussed, and it is pointed out that a much greater time is required for the establishment of the partition equilibrium with an ignited permutite, owing to the loss of its great porosity on ignition.—*R. E. Thompson.*

The Determination of Alkalinity in Culture Media. L. MICHAELIS. Z. Immunität. 32, 194–203 (1921). From Chem. Abst., **16**: 111, January 10, 1922. m-nitrophenol (0.3 gm. in 100 cc. distilled water) is used as an indicator for determining the H-ion concentration of culture media. The color change is from colorless to yellow.—*R. E. Thompson.*

The Fundamental Laws of Filtration. D. R. SPERRY. J. Ind. Eng. Chem. 13, 990–992 (1921). From Chem. Abst., **16**: 130, January 10, 1922. The relationship between flow of liquid, pressure, time, rate of deposition, resistance, per cent of solids, and resistance of filter base, are expressed in formulas previously developed. (Chem. Abst., 10, 2784).—*R. E. Thompson.*

Protective Covering for Steel Pipe. L. M. KLAUBER. Gas Age-Record, 48, 478–484, 514–516 (1921). From Chem. Abst., **16**: 131, January 10, 1922. Corrosion of pipes laid in acid or alkaline soils is prevented by a covering consisting of asphalt, asbestos felt, and burlap. The cost ranges from $2.04 to $6.78 per 100 feet for ¾-inch and 4-inch pipe respectively, the life of the covering varying from 8 to 15 years, depending on the nature of the soil. This covering is also effective in preventing electrolysis.—*R. E. Thompson.*

The Determination of Iron and Manganese in Water. W. O. Heublein. Wasser, 16, 237–239 (1920). From Chem. Abst., **16**: 133, January 10, 1922. Iron is estimated by treating 100 cc. of the sample with 1 cc. of 3 per cent hydrogen peroxide, 5 cc. of hydrochloric acid, and 9 cc. of 20 per cent potassium thiocyanate, and comparing the color so obtained with known standards. The method is sensitive to 0.05 p.p.m. The amount of manganese (in p.p.m.) present in a water is equal to the number of cubic centimeters of phenolphthalein (5 mgm. per liter in 50 per cent alcohol) required to impart, to a solution of sodium hydroxide, a color of equal intensity to that obtained by adding to 10 cc. of the sample, in a test tube, 7 drops of sulphuric acid (1:3), a few crystals of potassium persulphate, and 7 drops of 5 per cent silver nitrate, and immersing in boiling water for 20 minutes. 0.3 p.p.m of manganese can be estimated by this method.—*R. E. Thompson.*

Manganese in Ground Water and its Removal. L. Zamkow. Z. Wasserversorgung Abwasserkunde, 7, 31–33 (1920). From Chem. Abst., **16**: 133, January 10, 1922. A filter is described by means of which as much as 1.1 p.p.m. of manganese can be removed from water. The taste of drinking water is not impaired by 5 p.p.m. of manganese, but such water cannot be used in certain industries, such as fermentation, laundry, and dye manufacturing.—*R. E. Thompson.*

Modern Water Purification. W. Heym. Z. Wasserversorgung Abwasserkunde, 7, 70–72 (1920). From Chem. Abst., **16**: 133, January 10, 1922. Descriptions are given of the modern methods of purification, such as simple sand or alumina, ozone, ultra-violet radiation, calcium hypochlorite, aluminium sulphate, etc. No process can be considered as the ideal.—*R. E. Thompson.*

Grease in Boiler Feed Water. E. Ingham. Colliery Guardian, 122, 447–448 (1921). From Chem. Abst., **16**: 134, January 10, 1922. Grease is considered to be the most objectionable ingredient in feed water. Many explosions have been caused by the presence of this substance, and the difference in temperature between the hot side and the water side of a boiler plate may be as much as 550°F. in the presence of grease, as compared with 68°F. under normal conditions. In water containing calcium or magnesium carbonates and grease, emulsions are formed through which the steam bubbles cannot pass, and the water is prevented from coming in contact with the boiler plate. At the present time chemical precipitation combined with filtration is the only means by which grease can be removed from water.—*R. E. Thompson.*

Hague Water Supply. A. H. Pareau. Z. Wasserversorgung Abwasserkunde, 7, 43–45, 56–57 (1920). From Chem. Abst., **16**: 134, January 10, 1922.

A description of the Hague waterworks is given, dating from their inception in 1874. The latest type of filter consists of 75 cm. of beach sand, 15 cm. of river sand, 10 cm. of gravel, and four progressively coarser gravels 48 cm. thick.—*R. E. Thompson.*

Water Supplies of the Austrian Republic. A. Swetz. Z. Wasserversorgung Abwasserkunde, 7, 59–61 (1920). From Chem. Abst., **16**: 134, January 10, 1922. A description of the water supply systems in Austria is given, the Vienna supply in particular being described in detail.—*R. E. Thompson.*

Denitrification as a Means of Sewage Purification. E. A. Cooper, Biochem. J., 15, 513–515 (1921). From Chem. Abst., **16**: 134, January 10, 1922. The incubation of sewage with nitrate solutions and filter effluents leads to the destruction of a considerable amount of oxidizable material, as is indicated by the fact that the oxygen absorption figures for mixtures of tank liquors and nitrate solutions or filters effluents are considerably lower than those for the corresponding mixtures of tank liquor and water only.—*R. E. Thompson.*

Taste of Chlorinated Water. F. W. Sperr, Jr. Gas Age-Record, 48, 566–571 (1921). From Chem. Abst., **16**: 155, January 10, 1922. The objectionable taste imparted to chlorinated water by ammonia still waste can be avoided by mixing the waste with city sewage, the bacteria of which destroy the phenols. As much as 10 per cent of such waste can be mixed with the sewage.—*R. E. Thompson.*

Hydrogen ion Concentration and Color Removal. J. F. Brewster and W. G. Raines, Jr. J. Ind. Eng. Chem. 13, 1043–1044 (1921). From Chem. Abst., **16**: 170, January 10, 1922. In experiments on the decolorization of cane juice with carbon it was found that the decolorization increases with an increase in H-ion concentration, within the range of pH 4 to 8.—*R. E. Thompson.*

Color and Hydrogen Ion Concentration. W. D. Helderman and V. Khainovsky. Arch. Suikerind., 29, 1229–35 (1921). From Chem. Abst., **16**: 170, January 10, 1922. The color of tan liquors was found to change reversibly from light straw color at pH 3 to deep red at pH 12.—*R. E. Thompson.*

Canton Adopts Water Rate Zoning System. Editorial. Fire and Water Eng., 71: 2, 92, January 11, 1922. Canton, Ohio, divided into three zones, A, B and C. Zone payments are made four times a year, with no two zones paying during same month. Zone A payments January, April, July and October. Zone B payments February, May, August and November. Zone C payments March, June, September and December.—*A. W. Blohm.*

Removing Iron from Water Without Aeration. Waldo S. Coulter. Fire and Water Eng., 71: 4, 163, January 25, 1922. Special-closed system replaces aerator and rapid sand unit at Highstown, N. J. Water from 200-foot tube wells contains from 4 to 5 p.p.m. iron and 45 p.p.m. of carbon dioxide.

Closed system consists of withdrawal of water from wells and discharge through pressure filters, hydrated lime being applied by a dry feed machine, before filtration. Action of lime upon an iron-bearing water is found to be more rapid when operation is conducted under pressure. Where there is question of bacterial removal, this plant would hardly be applicable.—*A. W. Blohm.*

The City's Share of Water Expenses. Editorial. Fire and Water Eng., 71: 4, 174, January 25, 1922. Water Commissioners of Holyoke, Mass., call attention to fact that city should bear a part of the burden of the water expenses, especially in matter of fire protection and the rental of hydrants. This would eliminate dissatisfaction caused by the necessarily high water rents.—*A. W. Blohm.*

Zoning System in Water Works Billing. FRED. R. MORRIS. Fire and Water Eng., 71: 5, 207, February 1, 1922. City of Appleton, Wis., is divided into districts, with water bills for different districts due on different months, so that the collection of revenue is continuous throughout the year. Water bills of a different color are sent to the different districts. No increase in office force has been necessary, although the number of connections has been doubled.—*A. W. Blohm.*